

BRACHIOPODA FROM THE EARLY CRETACEOUS OF THE SOUTHERN EROMANGA BASIN, N.S.W.

by J. G. G. MORTON*

Summary

MORTON, J. G. G. (1982), Brachiopoda from the Early Cretaceous of the Southern Eromanga Basin, N.S.W. *Trans. R. Soc. S. Aust.* **106**(1), 35-38, 30 June, 1982.

Lingula from the Early Cretaceous of Australia have previously been identified with the English Cretaceous species *L. subovalis* Davidson. However, locally abundant lingulids from the Tibooburra area (north-western New South Wales) displaying muscle scars, show that the Australian specimens differ and are herein described as *Lingula sturti* n.sp. *Australiarcula artesiana* Elliott is also abundant in association with *Lingula* at two localities. The species was previously known only from Santos No. 1 Well at Oodnadatta, South Australia.

The occurrence of these species (particularly *A. artesiana*), a mixed assemblage of Aptian and Albian molluscs, and similar lithologies suggests correlation of the Aptian/Albian sandstone near Tibooburra with the Attraction Hill Sandstone and Coorikiana Member (Oodnadatta Formation) in South Australia.

KEY WORDS: *Lingula*, *Australiarcula*, Brachiopoda, Early Cretaceous, Eromanga Basin.

Introduction

Lingulids have been known from the Early Cretaceous of Queensland and S.A. for many years. Moore (1870) identified these as *Lingula ovalis* Sowerby, an English Jurassic species, although subsequent workers (Tate 1889; Etheridge 1901) favoured identification with the English Cenomanian *L. subovalis* Davidson, 1952. However, Day (1967a) expressed doubt that the Australian specimens were of the same species, although he and previous workers had not seen their muscular impressions. Articulate brachiopods are by comparison rare in the southern margins of the Great Artesian Basin, the only known terebratulid being *Australiarcula artesiana*, previously known from one locality. Both species occur at localities near Tibooburra, N.S.W. (Fig. 1). The lingulids are particularly well preserved and after careful preparation show internal features. The species occur at North Eagle Tank (Fig. 1) in a well sorted, fine to medium blue, calcareous, glauconitic sandstone (weathering buff-brown). The unit occurs near the middle of the Early Cretaceous marine shale sequence (with good Aptian and Albian faunas below and above, respectively). The unit was mapped by Rose (1967), on the MILPARINKA 1:250 000 Geological sheet, which he correlated with the Tambo Formation in Queensland. Fossiliferous slabs excavated during tank sinking are strewn

similar, but more weathered, rocks occur nearby and show cross-bedding, rippled sandstones (symmetrical), veins of fibrous gypsum

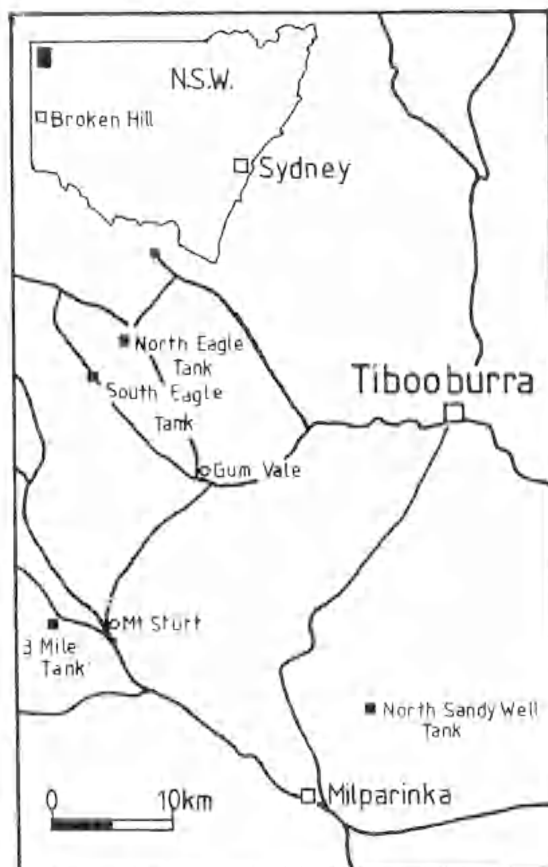


Fig. 1. Locality map.

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around the tank margin, and outcrops of and layers of cone-in-cone calcite. The associated fossils are a mixture of "Roma" (Aptian) and "Tambo" (Albian) types, similar to fauna described by Day (1967b), and include *Nucula (Leionucula) cooperi* (Moore), *Inoperna rugocostata* (Moore), *Tatella maranoana* (Etheridge, jr.), *Eyrena linguloides* (Hudleston), *Cyrenopsis corrugata* (Tate), *Dionitobelus dlptychus* (McCoy), *D. stimulus* (Whitehouse), and *Peratobelus oxyis* (Tenison-Woods). Ichnofossils are particularly diverse in this unit (Morton in prep.), and include *Rhizocorallium*, and a new type of graphoglyptid burrow. At other localities, these species occur in sandy shale, often with large subrounded boulders, and an associated fauna which is generally Aptian in age with some Albian elements.

Systematic Palaeontology

Family LINGULIDAE Menke, 1828

Genus LINGULA Bruguiere, 1797

Type Species *Lingula anatina* Lantarek

Lingula sturti n.sp.

FIGS 2, 3, 4, 5A-C

Named after Charles Sturt, an early explorer of N.S.W.

1879 *Lingula ovalis* Sowerby; Moore 236, 239, pl. 10, fig. 14.

1889 *Lingula subovalis* Davidson; Tate 230.

1892 *Lingula ovalis* Sowerby; Etheridge, jr. 444, pl. 20, fig. 14.

1901 *Lingula subovalis* Davidson; Etheridge, jr. 12.

1902 *Lingula subovalis* Davidson; Etheridge, jr. 8, pl. 1, fig. 1.

1966 *Lingula subovalis* Davidson; Ludbrook 193.

1967a *Lingula cf. subovalis* Davidson; Day 5, pl. 1, fig. 1, 2.

Material and Localities: Holotype and paratypes (AM F62069) on a single slab from North Eagle Tank, Gum Vale Station, and 4 other topotypic paratypes (AM F62065-F62068, F62063). Poorly preserved specimens were collected from 3 mile tank, Mt Sturt Station (AM F62064), North Sandy Well Tank, Peak Hill Station (all collected by the author), and 1 specimen "50 km NNE Tiboo-burra" collected by H. O. Fletcher, 1945 (AM F42221). Also recorded from "Minka" (Whitehouse 1927), "Wollumbilla and Ambley River, Mitchell Downs" (Moore 1870).



Fig. 2. Shell structure of *Lingula sturti* n. sp. Note outer cross-hatched layer. Shaded organic rich layers; unshaded phosphatic layers. Scale bar 0.1 mm.

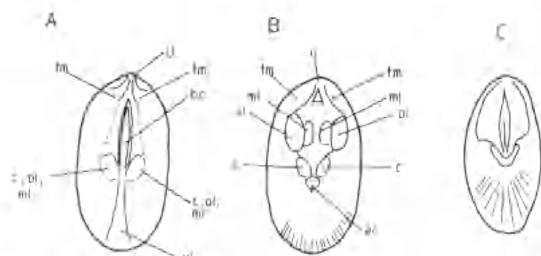


Fig. 3. A, B, *Lingula sturti* n. sp. Showing possible muscular interpretation. A—pedicle valve, B—brachial valve, U,u—Umbonal, tm—transmedian, bc—body cavity, c—central, ol—outside lateral, ml—medial lateral, vl—vascula lateralia, al—anterior laterals. C—*L. subovalis* (after Davidson, 1853) showing muscular impressions. (? pedicle valve).

"Jones Valley and Allaru Members, Eromanga Basin", and "Minmi member" (Day 1967a)—all from Queensland. Also Parabarana Sandstone and Attraction Hill Sandstone, S.A. (Ludbrook 1966).

Diagnosis: Small, oval *Lingula* internal structure with distinct narrow medial ridges in pedicle valve, and outside lateral scars relatively central in brachial valve. Transmedian scars in brachial valve straight or gently concave to posterior-lateral margin.

Description:

Shell Structure (Fig. 2). The shell wall is about 0.2 mm thick, consisting (in the inner 2/3 of the shell) of alternating layers of inferred phosphatic and organic rich layers (from the structure of living *Lingula*) each about 0.015 mm thick, somewhat irregular and discontinuous. The outer 1/3 of the shell is apparently of cross-hatched structure (not reported in living species of *Lingula*). Colour is dark-brown to black, the surface is shiny and polished.

Exterior. Shell small, outline elongate oval-elliptical (length:width, 2:1), apical

¹ Institutional abbreviations are: AM—Australian Museum; SAM—South Australian Museum.

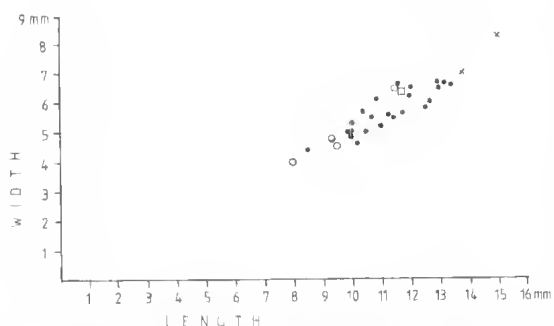


Fig. 4. Dimensions of *Lingula sturti* n. sp. Solid circles—Tibooburra specimens, open square—Holotype; open circles—Queensland specimens from Day, 1967a); crosses—*L. subovalis* (from Davidson, 1852).

angle large (c. 120°). Anterior-lateral margins straight, slightly converging toward the anterior. All other margins are gently convex. Both valves convex, maximum convexity near middle posterior. There appear to be two weak ridges on the posterior half of the holotype (angle between them, measured from the apex, about 20°) which delimits the area of maximum inflation. Ornament consist of fine regular concentric growth lines over the whole shell (about 10 per mm).

Pedicle Valve (Interior). The posterior half of the shell has 2 narrow, but distinct, medial ridges converging gently towards the umbo. Immediately anterior to the beak are

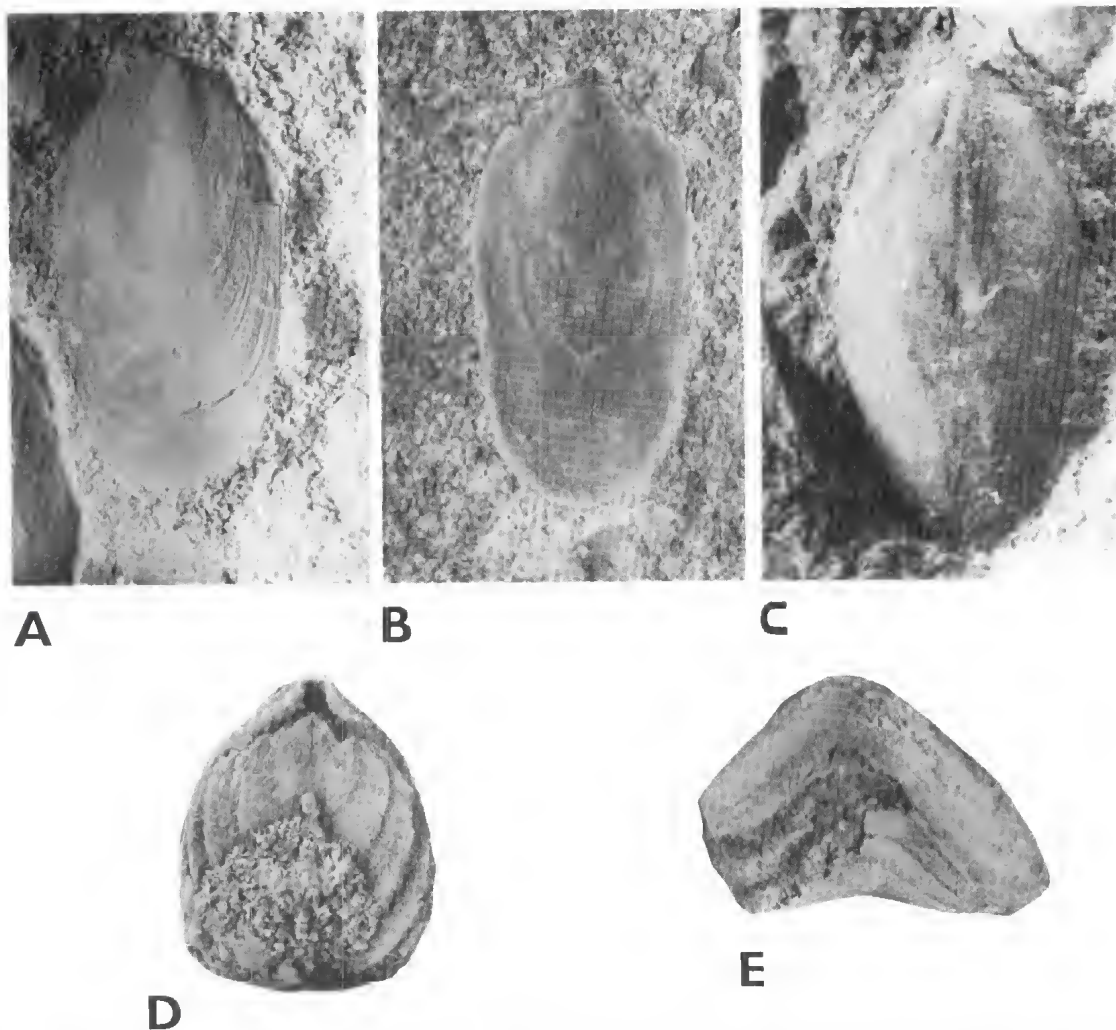


Fig. 5 A-C. *Lingula sturti* n. sp. A. Holotype (exterior) x 3.5 (AM F62069c, North Eagle Tank). B. Paratype (brachial valve) x 3.3 (AM F62063, "Gum Vale Station"). C. Paratype (pedicle valve) x 3.5 (AM F62069d, North Eagle Tank). D-E. *Australiarcula artesiana* (Elliott) (North Eagle Tank). D AM F62079, x 4.5; E AM F62074, x 5.

two short lateral scars, straight or slightly concave towards the lateral margins, and diverging anteriorly at c 50°. Near the middle are two small oval scars, the medial margins of which are the most distinctly marked. Anterior, there is a much wider, less distinct medial ridge.

Brachial Valve (Interior). The medial ridges on the posterior half are reduced or absent, and towards the lateral margins of the two short subumbonal scars are two long scars which are at first concave towards the lateral margins, then convex, and finally concave, converging to meet a small subcircular scar near the centre of the shell.

Remarks: The species (Fig. 5) is of a very similar shape to *L. subovalis*, but is never as large as the two specimens figured by Davidson (1852). It is easily distinguished on differences in the muscle scars (compare Figs 3B and C), and the external ornament (as remarked by Day 1976a), which is lacking except for a few widely spaced growth lines in *L. subovalis*.

Class ARTICULATA

Family TEREBRATELLIDAE King, 1850

Subfamily MAGADINAE Davidson, 1896

Genus *Australiarcula* Elliott, 1960

Australiarcula artesiana Elliott

FIGS 5D, E

Australiarcula artesiana Elliott, 1960, 26, pl. 2, fig. 1-7, text. fig. 1-3.

Description (External): Small ovoid shell, narrowing anteriorly with a strong median dorsal sulcus matched by a ventral keel giving a triangular cross section to the valves.

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Exterior smooth, commissure sulcate. Beak erect, foramen permesothrydrid.

Holotype: SAM F15278

Material and Localities: (16 specimens) AM F62070-F62080 (North Eagle Tank) and AM F62081-F62085 (South Eagle Tank).

Remarks: These specimens appear identical with those described from the type locality Santos Oodnadatta No. 1 Well, in S.A. This is apparently the first record of the species in surface sediments.

Conclusions

The faunal and lithological similarity between the Attraction Hill Sandstone and the Coorikiana Member (Oodnadatta Formation) in S.A. and the sandstones near Tibooburra, suggests that the units are coeval. Sedimentary structures, the general abrasion of the larger molluscs, the abundance of trace fossils (particularly *Rhizocorallium*) and fossil logs, suggest a very shallow water palaeoenvironment for these sediments. The occurrence of abraded Aptian molluscs (particularly *Maccoyella* and *Peratobelus*) with characteristic Albian molluscs at North Eagle Tank, suggests erosion of Aptian sediments in this area during Early Albian time, as a major eustatic sea level low in Early to Middle Albian time was recorded by Morgan (1980).

Acknowledgments

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